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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of:

Attorney Docket No.: 2950.20US01

Chaloner-Gill et al.

Confirmation No.: 2942

Application No.: 09/845,985

Examiner: Mark Ruthkosky

Filed: April 30, 2001

Group Art Unit: 1745

For: PHOSPHATE POWDER COMPOSITIONS AND METHODS FOR FORMING
PARTICLES WITH COMPLEX ANIONS

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

REPLY BRIEF FOR APPELLANT

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REPLY BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

INTRODUCTORY COMMENTS

This Reply Brief is in response to the Examiner's Answer of October 3, 2007.


This Reply Brief is thus timely filed.

Please grant any extension of time necessary for entry; charge any fee due to Deposit Account No. 50-3863.

CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that this paper is being transmitted by facsimile to the U.S. Patent and Trademark Office, Fax No. 571-273-8300 on the date shown below.

November 29, 2007
Date


Peter S. Dardi, Ph.D.

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ARGUMENT

Appellant provides the following response to issues raised in the Examiner's Answer.

Errors of Fact**Indefiniteness Rejection**

On page 11 of the Answer, the Examiner asserts that the phrases "less than" and "greater than" refer respectively to "maximum values" and "minimum values." With all due respect, that is an oversimplification. The term "about" generally refers to a specific value, or it serves no purpose. There is nothing special about the particular use in Appellant's specification just because "about" is used in conjunction with "less than" or "greater than." Therefore, Appellant does not understand the Examiner's reliance on page 12 on the assertion that there is something special about the usage in the claim of "end points." The expressions "less than about" and "greater than about" are no different intrinsically than "about 3" with respect to the intended meaning of about. The term "about" in all of these contexts just refers to uncertainty on the end points that generally can be understood in context by a person of ordinary skill in the relevant art. It is a clear error of fact to assert that "less than" and "greater than" refer to some end points that are not similarly present in all uses of the term "about."

On page 12, the Examiner asserts that if the particles can be measured "with such precision to determine a specific size, a nanometer as claimed, there is no need for the degree of error to more than a nanometer. The imprecision should be a small fraction of the size measured." With all due respect, this is at best unclear. Nano-scale technology is relatively new. In the powder arts, it is not clear if any effort has even been directed to evaluating the precision of measurements in the field. There are at best several contributions to the uncertainty including precision of the electron microscope measurements, imprecision in measurements from the micrographs, estimating a diameter for non-spherical particles, optical issues with respect to

depth of field in photographic representations of three dimensional materials, and the like. While the Examiner seems to know the measurement errors, people of ordinary skill in the art do not know this. The Examiner's assertions without any support whatsoever relating to accuracies of nanoscale measurements represent clear errors of fact.

Uniformity in Kamauchi

There is no discussion of uniformity of particle size in Kamauchi. On page 4 of the Answer, the Examiner states that the "lithium transition metal oxide active material is uniformly blended and formed into a positive electrode. The Kamauchi reference teaches uniformly blended mixture where no undesirably large, irregular pores are formed in the electrode. These irregular pores cause cracks and defects that decrease the capacity of the electrode." This is correct although at best irrelevant since the claims do not relate to blending in the electrode or reduction of cracking.

However, on page 15, the Examiner seems to incorrectly imply a connection between the teachings on pore sizes in Kamauchi with uniformity of particle size. Specifically, the Examiner stated that "As Kamauchi teaches submicron lithium metal oxide and phosphates active material uniformly blended such that no undesirably large, irregular pores are formed and cause cracks and defects in an electrode that decreases the capacity of the electrode and Manev teaches that a decrease in the mean particle distribution typically results in an increase in the cyclability of a battery, the skilled artisan would conclude from these teachings that a decrease in the mean particle distribution typically results in a uniform mixture that gives an increase in the cyclability of a battery during it's [sic] charge/discharge cycle." It is not clear how uniformity of particle size relates to the uniformity of the mixture or corresponding pore size. In fact, Kamauchi at column 5, lines 44-54 indicates that the electrical conductive agent can have a particle size 20 times or 0.02 time the active oxide particles while still yielding appropriate pore formation. Thus, Kamauchi teaches that particle uniformity is not needed to form appropriate pores

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indicates that Kamauchi teaches away from the claimed invention or at least that pore size issues do not support the Examiner's position.

Then, on page 5 of the Answer, the Examiner states that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to prepare an electrode comprising a collection of electrode material particles as taught in Kamauchi having a greater number of particles as close in size to the desired average diameter as possible, as a uniform, average diameter has been shown critical to the invention (see Kamauchi col. 5, lines 25-end; Manev col. 1, lines 34-50.)." This citation to Kamauchi refers to pores size issues that have not been correlated with uniformity in particle size. Pore size issues are discussed again on page 16 of the Answer. This misleading association of pore size with particle size uniformity of the electroactive material is a clear error of fact.

Assertions Relating to Grinding

In the Answer the bridging discussion on pages 17 and 18 asserts that "grinding particles under different conditions, such as for longer times or with more pressure would produce smaller particles." It is not at all clear where this assertion comes from. In fact, reality is far from being this clear. As the particles get smaller the grinding conditions change. Heat, such as from grinding, and pressure actually fuse particles through sintering such that additional grinding generally may not result in arbitrarily small particles. Grinding is very material dependent. The Examiner simply has supplied no basis for this assertion, and it represents an error of fact.

No Reasonable Expectation of Success

The Answer on page 17 states that the 132 declaration "merely points out that the process of Kamauchi does not produce a collection of particles with the claimed particle distribution." However, the approach of Kamauchi is an approach suggested by the Examiner to form submicron particles with the claimed particle size range and uniformity. Thus, the declaration

establishes that the approaches described in Kamauchi are not effective to produce the claimed materials. Also, as discussed above, Manev teaches away from the claimed invention.

On page 18, the Examiner provides a new arguments relating to filtering with citation to some specific patents. The final office action on page 5 makes a bare mention to filtering. First, Appellant notes that these patents relate to filtration of organic particles. (U.S. 6,432,192 (organic pigments), U.S. 4,915,837 (motor oil) and U.S. 4,747,959 (latex)). In contrast, the present claims are directed to inorganic particles. The chemical properties of organic particles are very different from inorganic particles. The filtration is performed obviously from a dispersion in a liquid. With inorganic particles, agglomeration is a prevalent issue in liquid dispersion. Thus, the Examiner's assertions simply do not provide a reasonable expectation of success with respect to forming submicron uniform collections of the claimed materials.

Unexpected Results

On page 19 of the Answer, the Examiner states that (emphasis in original) "To overcome this rejection, the burden is on appellant to establish unexpected results for their invention. Appellant has not submitted any *evidence* in this regard." While Appellant respectfully disagrees with the Examiner's assertion regarding burden shifting, Appellant has presented evidence of unexpected improved battery performance with respect to uniform nano-scale lithium iron phosphate. See Striebel and Delacourt articles in Appellant's Appeal Brief. It is not clear why the Examiner is ignoring this evidence other than it strengthens the Examiner's position to ignore this evidence. If anything, Manev's discussion of particle size effects teaches that this result is unexpected based on the particle size ranges of Appellant's claimed invention.

Rejection over Bodiger and BiAluminum Phosphate as a Battery Material

On page 20 and on page 21 of the Answer, the Examiner asserts that "Aluminum phosphate is a well-known active material in lithium batteries." This is a strong definitive statement presented without support. It also seems untrue even though stated twice for emphasis in the Answer. US 2005/0208384A describes aluminum phosphate as an inert additive in relatively small amounts that improves the performance of the active material. U.S. patent 7,081,320 teaches aluminum phosphate as an inert/inorganic glass surface coating for lithium batteries. So the Examiner's statement is a clear error of fact.

Evidence of Unexpected Results

In the bridging sentence on pages 21 and 22, the Answer states that "appellant has not provided any *evidence* of unexpected results." This statement is false, as discussed further above. See Striebel and Delacourt articles referenced in Appellant's Appeal Brief.

Errors of LawRejection Under 35 U.S.C. § 112

On page 3 of the Answer, the Examiner recites to the MPEP section 2173.05(b). However, the MPEP does not have the force of law. The case law affords the Amgen Inc. v. Chugi Pharmaceuticals Co., Ltd. case a very narrow holding. When viewed in the context of the present facts and more recent clarifying cases, this case simply does not support the present rejection.

Rejection Over Kamauchi et al. and ManevComparing the Teachings of References with the Claimed Subject Matter

On page 15 of the Answer, the Examiner asserts that Appellant is attacking references individually. Applicant simply has not done this. Furthermore, under a Graham analysis, the teachings of a reference as a whole do have to be considered. The Examiner has not performed a proper Graham analysis. This is a clear error of law. A proper obviousness analysis is discussed further below.

Manev Teaches Away

On page 16 of the Answer, the Examiner argues against Appellant's assertion that Manev teaches away. The Examiner's assertions are based on a limited reading of the reference. The law is clear that the references must be reviewed as a whole including subject matter that teaches away. At column 1, line 50 to column 2, line 4, Manev describes in detail why the particle size should not be too small. The Examiner simply ignores this discussion. At column 3, lines 53-61, Manev indicates that the manganese oxide starting materials should have a mean diameter "more preferably" between 5 and 15 microns. The resulting spinel lithium manganese oxide particles have a larger particle size than the starting material. See column 5, lines 17-21 ("For example, the mean particle size of the spinel is between about 10 and 15 microns when the mean particle size of the manganese compound is between about 6 and 7 microns when the starting materials are fired at between about 800°C and 900°C."). Note that "between about" seems clear enough to the persons of skill in the art that invented the subject matter of the Manev patent. See throughout and the Manev claims. In fact, in Manev claim 1 includes a process limitation presumably related to patentability, yet about was evidently clear enough to specify particle size in the micron range. Manev clearly teaches away from Appellant's claimed subject matter. It is an error of law for the Examiner to ignore particular portions of the reference that teach away.

The Examiner is making the same error with respect to milling. Manev clearly teaches that milling the active battery materials is not desirable. See column 2, lines 16-20 (Therefore, grinding the $\text{Li}_{1-x}\text{Mn}_{2-x}\text{O}_{4+y}$ material is not a desirable method of reducing the mean particle size and particle size distribution of spinel $\text{Li}_{1-x}\text{Mn}_{2-x}\text{O}_{4+y}$ intercalation compounds.). And all of the claims specifically exclude grinding. Yet the Examiner continues to make statements on page 17 relating to the teaching of grinding from Kamauchi. "The process of simply making small particles by grinding is taught to be successful." This is misleading on several levels. First, Manev teaches away from this approach, although the Examiner is still happy to combine Kamauchi with Manev despite the explicit and multiple contradictions in making the combination. Second, Appellant's declaration demonstrated that this approach is not suitable for making uniform submicron powders. The Examiner's selective review of the evidence is clear error of law.

Bodiger and Bi

Claimed Subject Matter to be Considered as a Whole

The Examiner stated on page 21 of the Answer that "when describing the claimed collection of particles, the difference between the prior art and the claims is not the material or the particle sizes, but the distribution of particle sizes." With all due respect the claimed subject matter should be considered as a whole and not parsed into particular elements. A proper analysis under Graham and KSR is discussed further below.

The claimed compositions of matter are characterized by the composition, the average particle size and particle size distribution. The Examiner has noted that Manev teaches these as being significant identifiable characteristics of powders for battery electroactive materials. Yet, to support the rejection over Bodiger and Bi, the Examiner has found it convenient to consider these separately rather than considering the claimed subject matter as a whole. This piecemeal consideration of aspects of the invention is a clear error of law. Furthermore, the Examiner has not

offered an explanation of how the combined teachings of Bodiger and Bi provide a reasonable expectation of success with respect to Appellant's claimed subject matter.

Analysis under Graham and KSR

The Supreme Court in *KSR Intern. Co v. Teleflex Inc.*, 127 S.Ct. 1727 (2007) emphasized the approach previously laid out in the Graham case. "Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the art resolved." *Id.* at 1734 (quoting from *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18 (1966)). The Court acknowledged that in more complex fact patterns different issues will be involved than those of a simple mechanical substitution. "Following these principles may be more difficult in other cases than it is here because the claimed subject matter may involve more than simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement." *Id.* at 1740. "As is clear from cases such as *Adams*, a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." *Id.* at 1741. However, under the present facts, the several elements are not known in the cited references. The Court also acknowledged that if a reference teaches away from the claimed invention than this tends to disprove obviousness. "The Court relied upon the corollary principle that when the prior art teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be nonobvious." *Id.* at 1740.

The Federal Circuit has addressed obviousness relating to chemical compounds post-KSR. "In addition to structural similarity between compounds, a prima facie case of obviousness also requires a showing of 'adequate support in the prior art' for the change in structure." *Takeda Chemical Industries, Ltd. v. Alphapharm Pty., Ltd.*, 492 F.3d 1350, 1356 (Fed. Cir. 2007) (citing *In re Grabiak*, 769, F.2d 729, 731-732 (Fed. Cir. 1985)). "We clarified, however, that in order to find

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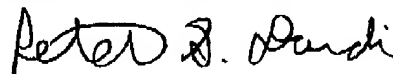
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a prima facie case of unpatentability in such instances, a showing that the 'prior art would have suggested making the specific molecular modifications necessary to achieve the claimed invention' was also required." *Id.* (citing *In re Deuel*, 51 F.3d 1552, 1558 (Fed. Cir. 1995), which in turn cited 4 earlier Federal Circuit cases). "That test for prima facie obviousness for chemical compounds is consistent with the legal principles enunciated in KSR." *Id.* Under the present facts, the cited references simply do not point toward the claimed invention, and the cited references do not provide a reasonable expectation of success in practicing the claimed invention. The legal conclusion of non-obviousness is clear and mandated by the case law.

CONCLUSIONS

Applicants submit that the pending claims are not rendered prima facie obvious over the combined teachings of the cited references. Applicants believe that the Patent Office has failed to meet their burden of persuasion with respect to unpatentability of any of the claims on the present record. Thus, Applicants Respectfully request the reversal of the rejections of claims 1-4, 6-9, 12, 14-21, 48-50 and 52-61.

Respectfully submitted,



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